

PYCNOPHYES CHUKCHIENSIS, A NEW
HOMALORHAGID KINORHYNCH FROM THE
ARCTIC SEA

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Abstract.—A new species of Kinorhyncha, *Pycnophyes chukchiensis*, is described and illustrated from soft sediments of the Chukchi Sea, about 430 km northwest of Point Barrow, Alaska, at a depth of 210 m. This is the fourth member of this genus described from Arctic waters. The presence of pronounced middorsal spinous processes on all but the terminal trunk segment, the twelfth spinous process extending well beyond the terminal margin, separates this species from all congeners. Two additional unidentified species of *Pycnophyes* are noted: one from the same area as the newly described species, and one from a second general area about 160 km northwest of Point Barrow.

Between May 1960 and March 1961 the Arctic Research Laboratory Ice Station I (Drift Station Bravo, Fletcher's Ice Island) was used as a platform from which benthic samples were collected as it drifted in the Chukchi Sea northwest of Point Barrow, Alaska. Two scientists, Robert Lavenberg and John Tibbs, collected eight benthic samples at depths ranging from 38–747 m from which they extracted several specimens of the phylum Kinorhyncha. The only species described so far from this material is *Echinoderes arlis* Higgins, 1966, a member of the order Cyclorhagida. This species was based on six specimens from two samples taken about 430 km northwest of Point Barrow, at the southern limits of the Chukchi Rise. The remaining three samples from this same general area contained four specimens of the homalorhagid genus *Pycnophyes*, two of the new species described herein and two of an unidentified species. A second area, about 160 km northwest of Point Barrow, yielded an additional five specimens of this same genus but not the same species. Of these specimens, only one was in a condition suitable for the description of a new species. Because additional

specimens were thought to be forthcoming but were not, this aforementioned specimen was set aside and the species it represented was not described.

Prior to 1960, only a single kinorhynch, *Echinoderes arcticus* (Steiner, 1919), had been found within the Arctic Circle. This cyclorhagid species, known only from a single specimen collected in the Barents Sea, near Murmansk, appears to be a juvenile stage of *Echinoderes* (Higgins 1983). Since the collection of the specimens from the Chukchi Sea (1960–1961), only two additional papers have described species from within the Arctic Circle. The most comprehensive study is that of Higgins & Kristensen (1988) in which five species of *Echinoderes* and two species of *Pycnophyes* are described from Disko Island, on the west coast of Greenland. More recently, two species of *Pycnophyes* were described from the Canadian coast of the Beaufort Sea (Higgins & Koczyński 1989).

Additional unidentified kinorhynchs from within the Arctic Circle have been reported by Sheremetevskij (1977) from the Laptev Sea in the vicinity of the Novosibirsk Islands, by Dinet (1977) from the Greenland

and Norwegian Seas, and by Carey & Montagna (1982) from the Alaskan coast of the Beaufort Sea. Recently, kinorhynchs have been collected by Kristensen (pers. comm.) from the Foxe Basin near Iglookik, Canada. Other unidentified Arctic Ocean kinorhynchs have been reported from Onega Bay of the White Sea (Galtsova & Sheremetevskij 1985).

Pycnophyes chukchiensis, new species

Figs. 1, 2

Diagnosis.—Trunk length 720 μm , segments nearly equal in width; lateral terminal spines 200 μm long, 28% of trunk length, tapering distally, curving mesially; four slightly emarginate dorsal, two even-margined ventral placids; subdorsal sensory seta centered about middistance from and on either side of dorsal midline on segments 4–11, lateroventral sensory setae on tergites 4–12 near tergal-sternal junction, ventral sensory seta about $\frac{1}{3}$ distance from mesial margin of sternites 4–12 with additional sensory seta near lateral margin of sternites 7 and 12; spinous processes on segments 3–12, increasing in length posteriorly, spinous process on segment 12 extending well beyond terminal segment; ventral plates of terminal segment with lateral margins forming prominent spinous projections.

Description.—Holotypic male (author's number RH 2314.1) USNM 234448 (Figs. 1, 2), trunk length 720 μm ; MSW-6 (maximum sternal width at segment 6) 84 μm , 11.7% of trunk length; SW (standard width at segment 12) 78 μm , 10.8% of trunk length.

Segment 2.—Consists of four slightly emarginate dorsal placids, 34 μm wide, and two even-margined ventral placids.

Segment 3.—Length 114 μm ; with pronounced, pointed anterolateral tergal processes; slight punctate sculpturing near anterior, even margin of tergal plate; subdorsal sensory seta near anterior margin, on either side of dorsal midline, in line with junction of each lateral pair of placids; small pore

mesial and slightly posterior to each subdorsal sensory seta. Midsternal plate 42 μm wide anteriorly, 80 μm wide posteriorly, lateral margins straight, with thin area adjacent to anterior margin; episternal plates with sensory spot near posteromesial margin, slight evidence of muscle scar, otherwise without distinguishing morphology.

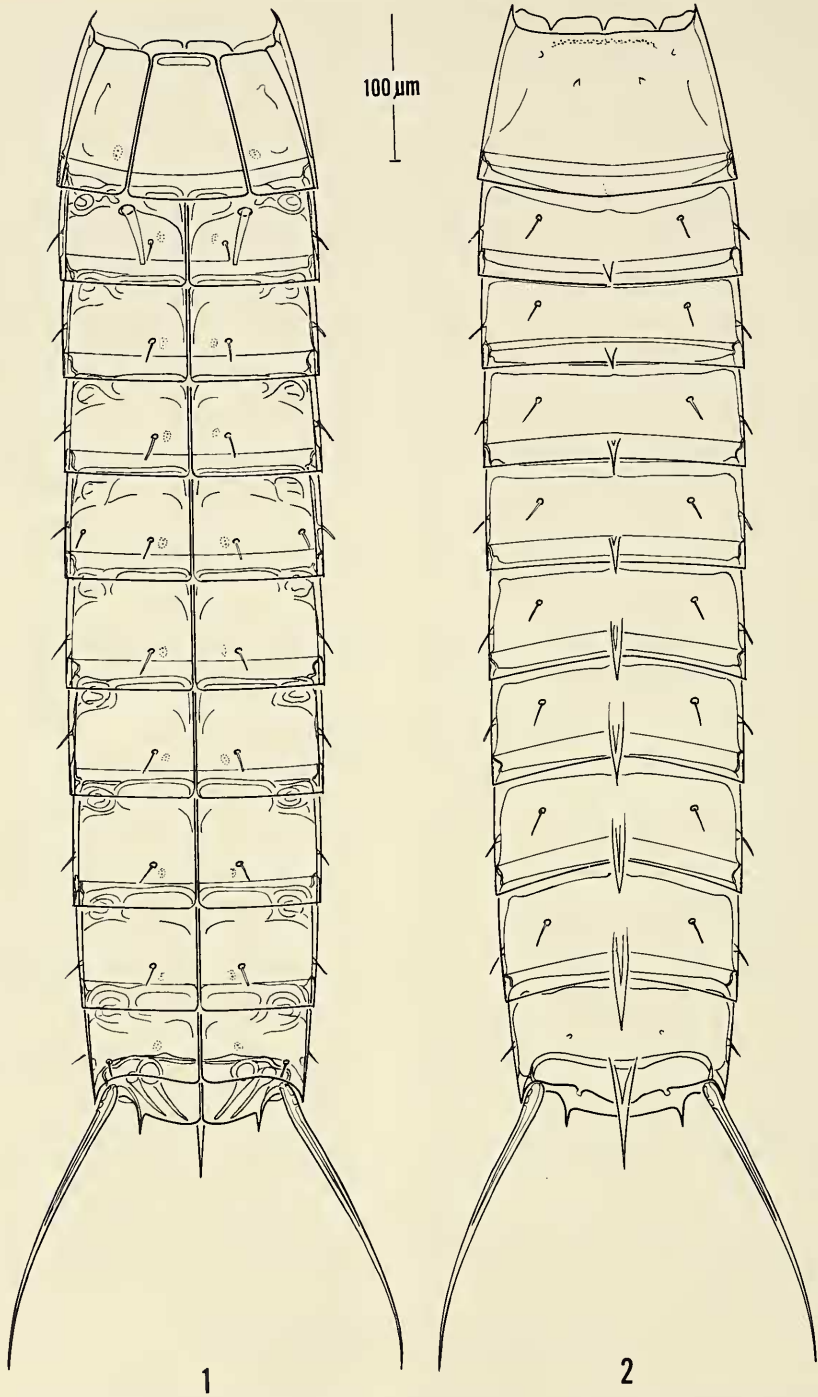
Segment 4.—Length 72 μm ; pachycycli of both tergal and sternal plates well developed (Figs. 1, 2), peg-and-socket configuration prominent at junction of tergal and sternal plates; tergite with small (10 μm long) middorsal process; subdorsal sensory seta centered on each lateral surface of tergite; lateral tergal seta near tergal-sternal junction. Adhesive tubes of male, 40 μm long, near anterior margin of each sternal plate, immediately posterior to pachycyclus, in line with episternal-midsternal junction of preceding segment; sensory seta posteromesial to each adhesive tube, near arthrocorial junction; sensory spot mesial to each sensory seta.

Segment 5.—Length 71 μm ; tergal plate with slightly longer middorsal process, otherwise similar to that of segment 4. Pachycycli of sternal plates less prominent, without adhesive tubes, sensory seta about $\frac{1}{3}$ distance from ventral midline (in line with sensory seta on previous segment), otherwise similar to that of segment 4.

Segment 6.—Length 71 μm , tergal plate with slightly longer middorsal process, otherwise both tergal and sternal plates similar to those of segment 5.

Segment 7.—Length 72 μm , tergal plate with slightly longer middorsal process, mesial element of sternal pachycyclus not rounded near junction with peg-and-socket area as in previous segments; additional sensory seta near lateral margin of each sternal plate (Fig. 1).

Segment 8.—Length 78 μm , tergal plate with slightly longer middorsal process (32 μm long), without sensory seta near lateral margin of each sternal plate; otherwise similar to segment 7.



Figs. 1, 2. *Pycnophyes chukchiensis*, holotypic male (USNM 235448): 1, Neck and trunk segments, ventral view; 2, Same, dorsal view.

Segment 9.—Length 80 μm , tergal plate with slightly longer middorsal process; otherwise similar to segment 8.

Segment 10.—Length 81 μm , tergal plate with slightly longer middorsal process; mesial element of sternal pachycyclus rounded near junction with peg-and-socket area as in segments 4–6; otherwise similar to segment 9.

Segment 11.—Length 83 μm , tergal plate with slightly longer middorsal process; otherwise similar to segment 10.

Segment 12.—Length 84 μm , tergal plate with distinctly longer middorsal process (76 μm long), projecting well beyond margin of terminal segment; subdorsal sensory setae not evident; sternal plates with sensory seta near lateral margin and additional mesially adjacent sensory seta, both near arthrocorial junction; sensory spot mesial to sensory setae.

Segment 13.—Length 50 μm , tergal plate slightly rounded with minute, rounded marginal projections subdorsally; sternal plates deeply incised near lateral margins to accommodate lateral terminal spines, lateral margin of incised portion extending posteriorly, spinously projecting well beyond terminal margin. Lateral terminal spines long, 200 μm , about 8 μm thick midlength, evenly tapered, slightly recurved mesially, 28% of trunk length. Paired penile spines lateral at anterior margin of each sternal plate, anteromesial penile spine 45 μm long, broadly rounded basally; posterolateral element shorter, 40 μm long, not enlarged basally.

Material examined.—Holotypic male, TL 720 μm long (RH 2314.1) USNM 235448, from soft sediment, 210 m depth, Chukchi Sea, Arctic Ocean, 74°48'N, 167°18'W, col. R. Lavenberg and J. Tibbs, 15 Mar 1961; paratypic juvenile J-6, TL 560 μm long (RH 2310.1) USNM 235449, from soft sediment, 197 m depth, Chukchi Sea, Arctic Ocean, 74°54'N, 167°18'W, col. R. Lavenberg and J. Tibbs, 15 Mar 1961. Type material is deposited in the Invertebrate Zoology collections of the National Museum

of Natural History, Smithsonian Institution, Washington, D.C. 20560 (USNM).

Remarks.—Of 27 described species of *Pycnophyes*, 19 have middorsal processes ranging from minute processes on *P. ponticus* Reinhard, 1881 to the elongate processes on such species as *P. carinatus* Zelinka, 1928, *P. chiliensis* Lang, 1953, and *P. odhneri* Lang, 1949. None of these, with the exception of *P. cryopygus* Higgins & Kristensen, 1988, has a middorsal spinous process on segment 12, and, in the latter species, this process is minute or absent.

A second both obvious and unique character of *P. chukchiensis* is the elongate spinous extension of the lateral margin of the terminal sternal plates. Several species have small, usually truncate or rounded extensions at or near the lateroterminal margins of the sternal plates of segment 13, but none are as distinctive as they are on the new species. Together with the extended middorsal spinous process of segment 12, a total of three spine-like structures extend from the terminal margin of the trunk.

Pycnophyes chukchiensis is one of only seven species of this genus not having distinctive Mittelwülste. The lack of these typically oval or bean-shaped thickenings of the cuticle at or near the anteromesial margins of the sternal plates (on at least segments 11 and 12) could indicate that the single adult specimen is newly molted, but I believe this is not the case. Nonetheless, *P. cryopygus*, also from Arctic waters, shares the absence of Mittelwülste with the new species. Similarly, the presence of a sensory seta near the lateral margin of each sternal plate of segment 7 is shared by the two species. In *P. chukchiensis* as well as *P. cryopygus*, lateral sensory setae are otherwise present on the ventrolateral margins of the sternal plates of segments 4–12. The arrangement of the remaining setae of the two species is sufficiently different to clearly separate them.

Although *P. cryopygus*, like the new species, has four emarginate dorsal placids and

two even-margined ventral placids, some punctate sculpturing near the anterior tergal border of segment 3, and protruding, but blunt, processes as extensions of the lateral margin of the terminal sternites, it has a much wider midsternal plate on segment 3, shorter, more robust lateral terminal spines in addition to the distinguishing characters noted previously.

Other specimens.—From a different station in the same area where *P. chukchiensis* was collected (about 240 km northwest of Point Barrow) five additional specimens of *Pycnophyes* were found (USNM 235506–235508). Of these, four are adults (three males and one female) and one is a juvenile. None is in a condition that allows an accurate taxonomic assessment, but all have a moderately wide midsternal plate, similar to *P. chukchiensis*, but do not have the prominent middorsal spinous processes. From the second general locality where Lavenberg and Tibbs collected kinorhynchs (about 160 km northwest of Point Barrow) two specimens of *Pycnophyes* were found (USNM 235509, 235510), one adult male and a juvenile, of a second unidentified species. The latter species, like the former, cannot be properly assessed because of the poor condition of the specimens. It can be distinguished from the first of the two unidentifiable species by the presence of a very narrow midsternal plate.

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